

March 2001

# EVALUATE THE LIFE HISTORY OF THE NATIVE SALMONIDS IN THE MALHEUR BASIN

Quarterly Report 5



DOE/BP-31260-1



This report was funded by the Bonneville Power Administration (BPA), U.S. Department of Energy, as part of BPA's program to protect, mitigate, and enhance fish and wildlife affected by the development and operation of hydroelectric facilities on the Columbia River and its tributaries. The views of this report are the author's and do not necessarily represent the views of BPA.

This document should be cited as follows:

<i>Tiley, Mark, Lawrence Schwabe - Burns Paiute Fish &amp; Wildlife Department, Quarterly Report 5 - Evaluate the Life History of the Native Salmonids in the Malheur Basin, Report to Bonneville Power Administration, Contract No. 1997BI31260, Project No. 199701900, 8 electronic pages (BPA Report DOE/BP-31260-1)</i>
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**Quarterly Report 5**  
 Evaluate the life history of the native salmonids in the Malheur Basin  
 Project No. 1997-019-00

**August 1- October 31, 1999**

**1999 Field Season**

<u>Task</u>	<u>Start and End Dates</u>
1.) Fish Collection.....	3/1/99 to 10/29/99
- Reservoir Trapping.....	3/29/99 to 5/4/99
- Angling Efforts.....	3/1/99 to 10/29/99
- Screw Trap.....	6/1/99 to 10/19/99
- Electrofishing.....	8/13/99 to 9/9/99
2.) Telemetry.....	3/11/99 to present
3.) Snorkel Surveys.....	8/3/99 to present
4.) Spawning Surveys.....	8/30/99 to 10/1/99
5.) Habitat Surveys.....	6/28/99 to 8/19/99

**1.) FISH COLLECTION**

A variety of fish collection methods were used to achieve various tasks. The tasks needed to be fulfilled through fish collection is as follows:

- Implant PIT/Radio Tags
- Population Surveys
- Redband Genetic Samples
- Age Class Data
- Migration Data

Implant PIT/Radio Tags

A total of twenty-five fish were tagged with radio tags. Five fish were tagged and released below Agency Dam (Beulah Reservoir) while twenty fish were tagged and released above the Dam. Fish were collected by angling, reservoir traps, and by the screw trap at Crane Crossing.

All radio tagged fish were tagged with a PIT tag. In addition to the radio tagged fish, 53 bull trout that were caught but too small for the radio tags were implanted with a PIT tag. The total number of PIT tagged fish for 1999 is 77 fish.

With one exception, all bull trout that were handled for either PIT and/or radio tag implantation recovered well with no complications. The one exception being a bull trout caught by an angler in the spillway below the dam that did not recover after being landed.

Angling proved to be effective in the capture of larger bull trout. Fifteen of the 25 radio tagged fish were caught by angling, 13 of them from the spillway below Beulah.

### **Crooked Creek bull trout, redband trout and brook trout population surveys**

Population surveys were conducted on Crooked Creek to achieve the following objectives:

1. Determine the distribution of bull trout, redband trout and brook trout and all other captured fish species.
2. Estimate the population size of all salmonid species.
3. Determine the age class composition of salmonid species.
4. Estimate the biomass of all salmonid species in Crooked Creek.

Fish species distribution was determined by electrofishing 50-meter (m) (164 feet) long enclosed sections of stream every 30-m (100ft) from the mouth of Crooked Creek upstream to the beginning of wetted channel. Isolated pockets of standing water, observed at the upstream end of wetted channel, was spot shocked. No bull trout were observed in Crooked Creek. Redband trout and brook trout were distributed 60 m upstream from the mouth of Crooked Creek almost up to the end of wetted channel.

Block nets were used to create 50 m enclosed sections to obtain salmonid population and biomass estimates. A 50% depletion protocol was implemented whereby, if 50% of the total number of fish observed on the first pass were observed on the second pass, another pass was necessary until the less than 50% reduction had been achieved. A single pass included 1 upstream pass and 1 downstream pass. Salmonid populations will be based on a 50% depletion estimation model. This methodology was developed by ODFW.

Age class composition will be determined for redband and brook trout based on length frequency distributions. All salmonid fork lengths were measured to the nearest millimeter (mm). Scale analysis from the North Fork Malheur may be used to confirm length at age estimates based on length frequency distribution data.

Biomass will be estimated by multiplying the population estimate by the mean weight of the respective salmonid species. All salmonids were weighed except for very small young of year (YOY), typically less than 60mm fork length that did not register on our scale. We will attempt to obtain weights for fry based on local redband and brook length-weight relationships.

#### Redband Genetic Samples

Redband genetic samples were collected throughout the North Fork Malheur Basin. Samples were collected from the reservoir traps at Beulah Reservoir and the screw trap site at Crane Crossing. Angling methods were used in streams that had known bull trout distributions. Electrofishing was used to collect redband genetic samples in streams that had no known bull trout distributions.

The Burns Paiute Fish and Wildlife Department coordinated with Katherine Kostow from the ODFW in Portland Oregon to determine possible distinct populations or groups of redband trout within the basin. These populations or groups were separated according to the geographic nature of the basin. A total of five groups were defined as follows:

- ◆ Beulah Reservoir
- ◆ Little Malheur Drainage
- ◆ Bear Creek Drainage
- ◆ Crane Creek Drainage
- ◆ Upper North Fork and Headwater Tributaries

A total of 180 samples were taken. We need a minimum of 30 samples from each group to be sent to Montana State University for genetic analysis. It was recommended that our samples represent various age classes. We have collected all of the samples and will send them off to off for analysis as soon as the contractual process is finished Montana State University.

#### Age Class Data

Scale samples were collected to determine age class structure. Lengths were recorded and some weights taken on the fish sampled. Redband scales were taken the same time the genetic tissues were taken, so no extra collection effort was needed. Bull trout scale samples were taken on all bull trout that were angled or caught in reservoir traps or screw trap site.

During the 1999 field season, a total of 85 bull trout scale samples were taken and 117 samples taken from redband trout. These samples will be sent into ODFW for age class analysis.

#### Migration Data

PIT tags were implanted into bull trout to determine migration patterns of juvenile fish. The trout were collected by angling, the screw trap, and the reservoir traps. The idea of recapturing PIT tag fish could give us some insight into migration patterns. A total

number of 12 fish were recaptured in 1999, 5 fish initially caught and tagged in 1998 and 7 fish from 1999.

The recaptured fish from 1998 included 1 PIT tagged fish and 4 radio tagged fish. The PIT tagged fish was first captured in the screw trap and tagged in September 1998 and recaptured in April 1999 at Beulah Reservoir in a Fyke Net. Four radio fish from 1998 were caught in the spring of 1999, which include two in Beulah Reservoir traps, and two others caught angling in the spillway below the dam.

In November 1998, eleven radio tagged fish migrated back to the reservoir. Of these eleven fish, two were eventually entrained over Agency Dam. These two fish were caught angling in the spring of 1999. Both radios were not working at the time of recapture. One fish died due to angling and the other was implanted with a new tag and released above in Beulah Reservoir. Entrainment rate of our 1998 radio tagged fish is at least 18%.

### **Redband trout migration**

Redband greater than 100mm fork length received an upper caudal fin-clip 6/5/99 to the end of the screw trap sampling period on 10/19/99 to determine screw trap capture efficiency and migration data. A similar mark-recapture program was implemented to determine the migration behavior of YOY redband from 09/10/99 to 10/19/99. A small segment of the upper caudal lobe was clipped on redband YOY >55mm fork length once every three or four days. The percentage of recaptures observed on each day following clipping was recorded. The majority of recaptures were observed the day after clipping which suggested that the fish captured in the screw trap were undergoing a downstream migration.

The recapture data will also provide us with the ability to estimate the capture efficiency of the screw trap for redband of different age classes and subadult bull trout. Based on this efficiency data, we can estimate the total number of salmonids that passed by the screw trap from 06/03/99 to 10/19/99.

## **2.) TELEMETRY**

A total of twenty-five fish were implanted with radio tags in 1999. In April, two newly radio tagged fish were entrained over the Agency Dam. Through our telemetry efforts we found that the fish below Agency Dam remained near the spillway. Due to the target short fall of 25 radio tagged fish above Agency Dam, two radio tagged bull trout were caught in the spillway by angling and moved above the dam. Both of these fish eventually migrated upstream to the upper North Fork Malheur River.

As of November 1, 1999, we have recovered four radio tags from 1999 implants. Three were above agency dam and one below. In all cases, only radios were recovered and no dead bull trout were observed.

All radio tagged fish in the reservoir migrated upstream. In late May, one fish was tracked as far as 2 miles above the reservoir then dropped back into the reservoir by July. Otherwise, all fish made the migration up the North Fork Malheur past the USFS boundary by mid July.

### **3.) SNORKEL SURVEYS**

In August of 1998, FLIR flights over the North Fork Malheur River were conducted to determine cold water refugia. Cold water refugia were defined and located by USFS and BLM personnel. Personnel from the Tribe, BLM and USFS snorkel sites to determine bull trout utilization of these microhabitats.

A total of 30 sample sites were selected on three distinct reaches of the North Fork Malheur River. Five pools and 5 riffles were snorkeled on each reach. Bull trout were observed only in upper reaches.

One of our objectives was to find bull trout juveniles or sub-adults in the lower reaches of the North Fork. From our data we can predict that adults migrate down during October and November, but we need to find out what age class enters Beulah Reservoir and what time of year. Snorkel surveys are being conducted to determine presence/absence of sub-adult/juvenile bull trout in the lower reach of the North Fork Malheur River during this time period.

### **4.) SPAWNING SURVEYS**

The Tribe participated in Spawning Surveys for three weeks beginning in late August and ending in early October. ODFW lead the spawning surveys and is currently analyzing the data collected during these three weeks. Early findings suggest an increase in spawning activity from 1998.

### **5.) HABITAT SURVEYS**

An estimated 31 miles of stream was surveyed this year using USFS stream survey protocol. Three streams in the Middle Fork Malheur basin was surveyed while two streams were surveyed in the North Fork Malheur basin. They would include:

- ◆ Crooked Creek (Middle Fork)
- ◆ Big Creek (Middle Fork)
- ◆ Lake Creek (Middle Fork)
- ◆ Crane Creek (North Fork)
- ◆ Little Crane Creek (North Fork)

The data is to be entered into a USFS database known as SMART. This will summarize data collected that will then be analyzed and written in a final report.

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